becoming her 'lord and master.' The first kind was common at the time of Mohammed, and was with difficulty, if at all, abolished by him. Under it, as well as under Beena marriage, kinship could have been reckoned only through females. Before Baal marriage was established, a kind of Thibetan polyandry had prevailed, which he calls Baal polyandry, in which the husbands were all of one stock. From this arose the habit of acknowledging kinship through males. This Baal polyandry had grown out of the custom of marriage by capture, which was older than that of marriage by purchase, and continued after the latter custom had sprung up. In Baal marriage, of course, whether constituted by capture or by contract, the children would be regarded as belonging to the blood of the father.

We regret that we cannot allude to many other important subjects, especially that of the prohibited degrees, from which useful light may be derived upon the problems of early kinship, as well as to numerous excursuses in the notes upon interesting archeological topics. We can only refer general students of early society, as well as all who are interested in old Arabia, to this valuable work, which, having been expanded and rewritten from a course of university lectures delivered in 1885, contains the last word in the important controversy of which we have attempted to sketch the outline. H. W. H.

THE OIL-WELLS OF BAKU.

BAKU is a seaport town of the Apsheron peninsula, in the Caspian Sea, in the most southern part of the Russian territory. The adjacent region has long attracted the attention of the surrounding nations, on account of the naphtha with which the soil is impregnated. The inflammable gases issuing from the ground rendered the locality sacred in the eyes of the Parsees, or fire-worshippers, who have long resorted to it from distant places. The peninsula is an arid waste; and one of the most serious difficulties encountered is the scarcity of water, both for mechanical and dietetic uses. The centre of the oil-industry, according to F. Vasilieff, as given in the Proceedings of the Institution of civil engineers, does not exceed four and a half square miles in area, which forms, indeed, the centre of the whole oil-bearing region of the Caucasus.

The earliest oil-wells date back for centuries. A Persian inscription has been found which fixes the date of one of them at 1594. After the cession of the country to the Russians in 1813, the oil-industry was under the control of the government, and up to 1873 the entire revenue derived from this source did not exceed fifty thousand dollars. The manufacture of kerosene commenced in 1858, after which the industry began to develop slowly; but within the last fifteen years it has increased with greater activity. At that time land was sold at auction, and brought as high as five thousand dollars per acre. The old crude methods and shallow wells were abandoned, and at present there are more than five hundred borings. The yield has now reached a million tons per annum.

The naphtha-bearing strata, three of which are so far known, belong to the lower miocene formation. They dip at an angle of from 20° to 40°, and are composed of sand, calcareous clays, marls, and in places compact sandstone, often of great thickness. Organic remains are wholly absent. The naphtha-bearing sands are in a semi-fluid condition, and, when brought to the surface, give off carburetted-hydrogen gas. Not only do these sands give much trouble, but the salt water associated with them makes the driving of bore-wells difficult.

The plateau is a hundred and forty feet above the surface of the Caspian Sea, and the bores reach as deep as six or seven hundred feet. The depth, however, depends upon the yield and the quality of the oil. At first the oil does not reach high in the borings; but, as the depth increases, it rises, and at last is forced out by the pent-up gases.

A naphtha-fountain differs very much from one of water. The oil, on leaving the pipe, is broken up into many jets, which scatter in all directions. The larger part, on account of the liberation of the occluded gases, is shattered into the finest spray. Together with the oil, there is ejected an immense quantity of sand, stones, lumps of clay, some of the pieces being very large. This condition of things is explained by the high pressure of the gases, which has been measured in closed bore-pipes, and found to range between fifty and three hundred pounds per square inch. In the year 1883 two fountains played simultaneously to a height of between two hundred and fifty and three hundred and fifty feet. When a fountain breaks out, the boarding of the boring-turret is soon torn off, stones are thrown up to a great height, and it is dangerous to approach the bore, especially from the circumstance that the naphtha spray has an inebriating effect on the workmen. A cloud of naphtha hovers over the fountain, and is carried to great distances by the winds, covering every thing it passes over with a light film of oil. The sand thrown up forms a hillock round the well, often rising to twenty-eight feet in height. The bursting-forth of a fountain is accompanied by loud noises and a trembling of the earth. Millions

of tons of oil have been lost from an inability to direct it into reservoirs, which are frequently not even prepared before the need of them arises. Some fountains are intermittent, and play from one to two or three hours at a time, and then cease for a day or so. These are the most convenient, as they give plenty of time to arrange for collecting the oil. In some cases the action has to be started by withdrawing a few scoops of oil from the bore, and thus disturbing the subterranean equilibrium.

Continuous fountains sooner or later become intermittent, and then, like the latter, settle down into ordinary wells, from which the oil must be raised by the usual methods. The jet sent out of a bore-pipe appears urged forward by a rapid succession of pulsations; but periods of quiet may be noted, during which the fountain seems to gather up its strength for an extra energetic effort. The height of the jet varies with the intensity of the pulsations. A continuous fountain may yield over thirty-three hundred tons of oil, and require the labor of a hundred men to collect and store it in reservoirs. The daily yield would be worth five hundred dollars, the cost of labor being from seventy-five to a hundred dollars.

The condition of the oil is such, that, when no longer forced out by internal agencies, it must be removed from the bores by means of scoops: hence the bore-holes have to be large, usually sixteen inches in diameter, and, having to be maintained at that diameter throughout, must be lined with bore-pipes. The cost of these bore-pipes is a serious item, in a well of six hundred feet in depth costing twenty-five hundred dollars, while the expense of sinking the bore amounts to about five thousand dollars.

The owners of allotments are free to sink their bore-holes where they like: hence they are mostly sunk along the boundaries of the plots, and not at the points which the lay of the strata would indicate to be the most advantageous. The reason for this is, that each proprietor considers, that by sinking a bore near his neighbor's plot, if he succeed, he will get his own oil and a good deal of his neighbor's also. His neighbor is actuated by the same motives: hence the allotments have the appearance of fortified places, being surrounded by works, and unoccupied over the greater portion of their inner areas. Naturally, if a bore be exceptionally successful, a large number of additional ones are at once driven, and the yield of each is in consequence reduced.

The mean produce of the one hundred wells now in action is given at thirty-two tons per well per day, from March to November. The average cost of production is about twelve dollars per ton, nearly five per cent of which is due to the scarcity of water.

A commission appointed by the government reports that a pipe-line from Baku to Batoum on the Black Sea is indispensable for the higher development of this industry, as at present not one-half of the valuable products are obtainable. The commission, however, thinks that the undertaking should be left to private enterprise. The Transcaucasian railway will in a measure aid in the transportation.

RATIO OF INCREASE OF HEIGHT TO INCREASE OF BULK IN THE CHILD.

SOME remarkable observations, we learn from the *Lancet*, have been recently made by the Rev. Malling Hansen, principal of the Danish institution for the deaf and dumb, on the progressive increase in height and weight of children, one hundred and thirty of whom were under his charge. Of these, seventy-two were boys and fifty-eight girls, and they were weighed in batches of twenty, four times daily, — in the morning, before dinner, after dinner, and at bed-time. Each child was measured once a day. The weighings and measurements extended over a period of three years, and the results showed that the increase in the bulk and height of the body does not proceed at a uniform rate throughout the year. Three distinct periods, with some minor variations, were observed. In regard to bulk, the maximum period extends from August until December; the period of equipoise lasts from December until about the middle of April; and then follows the minimum period until August. In regard to height, the maximum period corresponds to the minimum period of increase in bulk. In September and October a child grows only a fifth of what it did in June and July. So it appears that during the autumn and the beginning of winter the child accumulates bulk, but the height is stationary. In the early summer, on the other hand, the bulk remains nearly unchanged, but the vital force and nourishment are expended to the benefit of height. When the body works for bulk, there is rest for growth, and *vice versa*. Mr. Hansen has observed a similar ratio of increase of bulk to increase of height in trees. In regard to the minor variations observed, it is probable that they are dependent, in part at least, upon the external temperature; so that, when this runs up, there is marked increase in weight, while a diminution of weight occurs with a fall of temperature.

Mr. Hansen's observations are undoubtedly of considerable importance. Similar ones have been